





## FRENCH BROAD RIVER MPO

TRAVEL DEMAND MODEL OVERVIEW

September 25, 2014

## WHAT IS A TRAVEL DEMAND MODEL

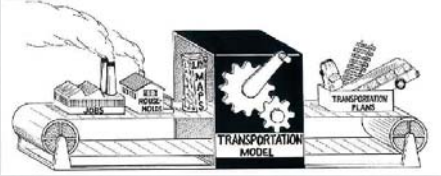




Figure from Inside the Black Box: Making Transportation Models Work for Livable Communities 2


## VALUE OF TRAVEL DEMAND MODELS



Planners  
Highway Designers  
Transit Operators  
Decision Makers



Long Range  
Transportation Plan  
Environmental Impact  
Studies  
Prioritizing Investments  
Conformity Analysis



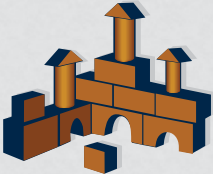
Number of Trips  
Traffic Volumes  
Transit Ridership  
Trip Length  
Vehicle Miles Traveled  
Speeds

Quantitative Measure ..... Political Process

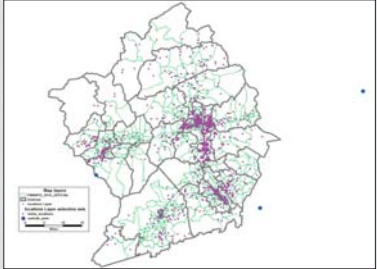
## KEY ENHANCEMENTS

- Best practice model design based on locally observed travel behavior
- Predictive transit model that includes premium modes
- Recreational Vehicle model
- Includes seasonal households
- Visitor model
- Feedback to account for congestion
- Customized reports to make the data more accessible and easier to use

## BUILDING BLOCKS



## HOUSEHOLD SURVEY – SURVEYED HOUSEHOLDS

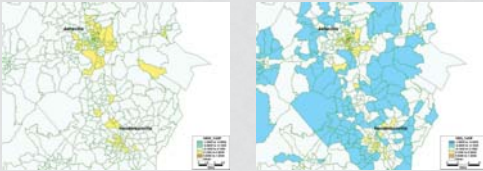


## HOUSEHOLD SURVEY – WHAT WE LEARNED

- Able to capture more markets
  - Stratification of households by income, auto ownership, household size and workers
  - Include new trip purposes for school trips, university trips, non-home based work related trips
  - Captured travel behavior for seasonal households

## HOUSEHOLD SURVEY – WHAT WE LEARNED

- Better understanding of trip making by geography



## HOUSEHOLD SURVEY – WHAT WE LEARNED

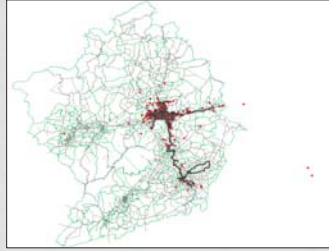
- Average trip lengths for FBRMPO are shorter on average than National trends

Purpose	Average trip length (min)		
	Survey	Model	Old Model
HBW	12.23	12.27	22.3
HBO	9.09	9.13	18.6
HBS	8.85	8.98	16.1
NHB	8.04	8.49	14.8

## RV SURVEY - OVERVIEW

- July 2013
- Sample – 70 RV households
- In-person, retrospective survey
- Statistics
  - 61.4% at least one month
  - 35.6% less than a month
  - 3% unsure

## TRANSIT SURVEY - SURVEYED HOUSEHOLDS



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## PASSIVELY COLLECTED MOBILE PHONE LOCATION DATA

- Entire Month of May 2013
- AirSage, an Atlanta based wireless information and data provider
  - Anonymous location and movement of mobile devices derived from wireless signaling data
  - Very large data set
- Used to develop through trip tables and to estimate an external trip model

## CALIBRATED TO NATIONAL STANDARDS



## MODEL VALIDATION

- Transit Riders: within 14% of observed
- Highway VMT: within 2% of observed
- %RMSE for modeled traffic vs. traffic counts: 37.8%

## HIGHWAY ASSIGNMENT

### %RMSE by Volume Group

Volume Group	Observations	%RMSE	Target
0 to 4,999	423	85.38%	120%
5,000 to 9,999	175	43.11%	45%
10,000 to 19,999	153	31.36%	40%
20,000 to 39,999	107	19.36%	35%
40,000 to 59,999	4	9.07%	30%
60,000 and greater	-	-	20%
<b>Total</b>	<b>862</b>	<b>37.80%</b>	<b>30-40%</b>

## HIGHWAY ASSIGNMENT

### Screenline Analysis

Name	Total Estimated Flow	Total Observed Flow	% Deviation
1	164,725	174,414	-5.6%
2	68,442	62,051	10.3%
3	28,933	27,139	6.6%
4	44,335	42,827	3.5%
5	99,234	90,541	9.6%
6	146,303	134,225	9.0%
7	53,704	58,623	-8.4%
<b>Total</b>	<b>605,676</b>	<b>589,820</b>	<b>2.7%</b>



## SENSITIVITY TESTS

- Land use
  - 2040 land use on 2010 transportation system
  - Responsiveness to specific TAZ level data
- Highway
  - New location roadway
- Transit
  - Express bus
  - Bus Rapid Transit
  - Light Rail Transit
- Results – model is sensitive to changes in major inputs and performs reasonably in response to changes in transportation supply

## FUTURE APPLICATIONS

- Key project decisions (I-26, Balfour Parkway, Others)
  - Updated model profiles travel demand by user
- Evaluation of transit alternatives and strategies
- Understanding special markets
- Understanding travel patterns
- Time of day analysis
- Credibility/Public trust



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